

2.6.2 Monopole Antenna

The monopole antenna, shown in Figure 2.11, results from applying the image theory to the dipole. According to this theory, if a conducting plane is placed below a single element of length $L/2$ carrying a current, then the combination of the element and its image acts identically to a dipole of length L except that the radiation occurs only in the space above the plane as discussed by Saunders [8].

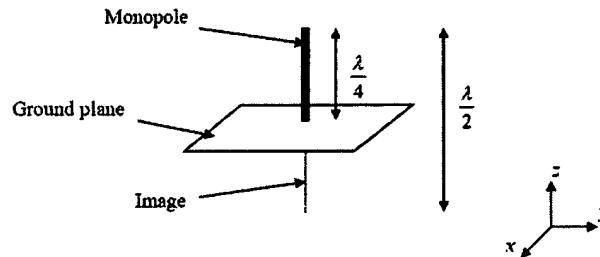


Figure 2.11 Monopole Antenna

For this type of antenna, the directivity is doubled and the radiation resistance is halved when compared to the dipole. Thus, a half wave dipole can be approximated by a quarter wave monopole ($L/2 = \lambda/4$). The monopole is very useful in mobile antennas where the conducting plane can be the car body or the handset case. The typical gain for the quarter wavelength monopole is 2-6dB and it has a bandwidth of about 10%. Its radiation resistance is 36.5Ω and its directivity is 3.28 (5.16dB) [4]. The radiation pattern for the monopole is shown below in Figure 2.12.

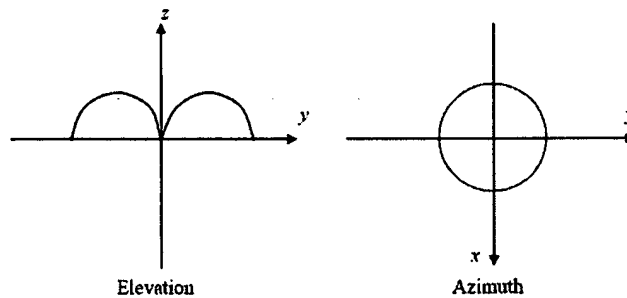


Figure 2.12 Radiation pattern for the Monopole Antenna